

## Consumer evaluation of the flavour of bacon cured with and without sodium nitrite

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The flavor of bacon has been, for the most part, related to the use of nitrite salts in the cure. Mottram & Rhodes (1974) reported at the last meeting that increasing concentrations of nitrite produced more bacon flavour and decreased the level of 'porky' flavor. Herring (1973) demonstrated that the acceptability of bacon made without nitrite decreased with storage time. The data of both workers show, however, that initially, bacon made without nitrite had a certain amount of acceptability. In our earlier studies (Kimoto et al. 1976) with bacon prepared with and without nitrite in the laboratory, panelists rated the flavour of the 'no-nitrite' bacon comparably with that of a popular national brand bacon. An 'Open House' demonstration for the public at our Center presented us with the opportunity of conducting a large-scale consumer test of the flavour of bacon prepared with and without nitrite.

### Experimental

Bacon was prepared by a national producer according to his standard procedure. The basic cure solution contained salt, sugar, tripolyphosphate, and ascorbate. Half the bellies were pumped with this solution, the other half received this solution plus  $\text{NaNO}_2$  at 120 mg/litre. Processing, smoking, and packaging were the same as for the commercial product. The bacons were stored and shipped under refrigerated conditions. Fifteen days after being processed the bacon was fried for 5–6 min at 165 °C, and submitted to our Open House visitors for evaluation. These panelists were given a questionnaire requesting information on sex (male or female); age group (< 21; 21–30; 31–40; > 41), and frequency of eating bacon (at least once a week; at least once a month; less often). They were asked to rate the flavour of the bacon on a 7-point hedonic scale (1 = dislike extremely; 7 = like extremely) and to indicate their preference for the bacon made with  $\text{NaNO}_2$  or that made without  $\text{NaNO}_2$ . The results were analysed by standard statistical procedures.

### Results and Discussion

Of the 969 visitors who participated in the test, the responses of 265 had to be rejected because the questionnaire was filled out incompletely or incorrectly. The

Table 1. Hedonic Evaluation and Preference Selection of Bacon Cured With and Without Nitrite.

Category	Average Rating <sup>1</sup>		Average Preference <sup>2</sup>
	nitrite cure	no nitrite cure	
Female	6.16	6.10	1.50
Male	6.07	5.97	1.50
< 21	6.13	5.95	1.46
< 30	5.90	5.95	1.50
< 40	6.17	6.13	1.50
> 41	6.18	6.09	1.53
Eat once a week	6.20	6.13	1.52
Eat once a month	6.06	6.07	1.50
Eat less frequently	6.04	5.83	1.47
Average	6.10	6.00	

1. Based on 7 point scale: 1 = dislike very much; 7 = like very much.

2. Preference for bacon cured with nitrite = 1; preference for bacon cured without nitrite = 2.

remaining 704 responses came from 350 men and 354 women. The data were analysed for all variables – sex, age, frequency of consumption, and all possible interactions. The results are shown in Table 1. Regardless of the variable, the average for that group differed only slightly from a value of 6.0 ('like moderately') for bacon prepared with nitrite and that prepared without nitrite. Although the preference could have been determined from the ratings in the hedonic test, the panelists were requested to list their preference. For purposes of analysis, preferences for bacon made with nitrite were rated as 1 and those for bacon without nitrite as 2. Table 1 indicates an average value of about 1.5 for each variable, indicating no preference between the flavour of the two bacons.

There was a difference in the colour of the bacons after frying which was not hidden or disguised.

It appears, therefore, that bacon with flavour acceptable to the average consumer can be made by processing with salt and no nitrite. It is possible, however, that smoking the product may provide desirable notes as well. This study dealt only with flavour and did not consider the effects of nitrite on storage stability or the prevention of growth of *Clostridium botulinum*.